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(54) **Battery Holders**

(57) A battery holder for a standard battery having differently sized terminals comprises a resiliently mounted insulating terminal plate assembly 2 provided with holes to match the battery terminals 5 and 6 and electrical contact members behind the holes with which the battery terminals can only make contact when inserted through the holes with the battery the correct way round. A backstop 3 is positioned to hold the opposite face of the battery and preferably the distance between the terminal plate assembly 2 and the backstop 3 is slightly less than the length of the battery so that the assembly 2 must be moved against its resilient mounting to accommodate the battery. (Fig. 2).

The drawings originally filed were informal and the print here reproduced is taken from a later filed formal copy.

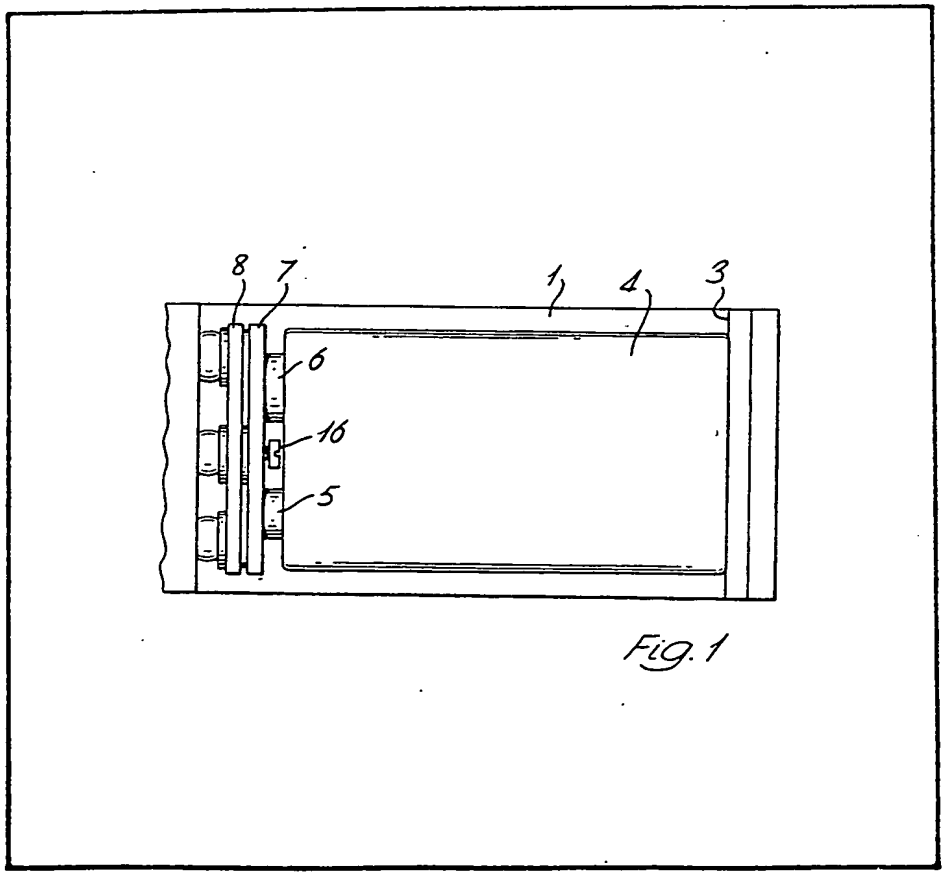

Fig. 1

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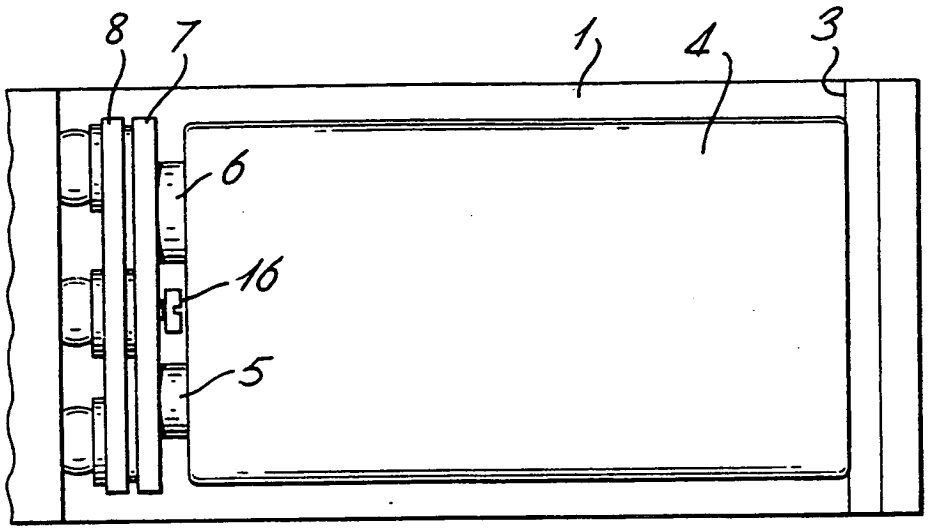

Fig. 1

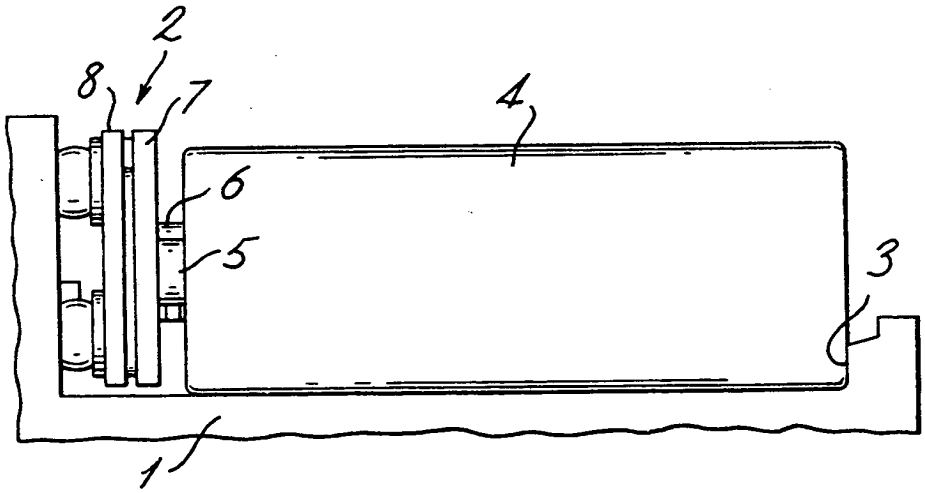

Fig. 2

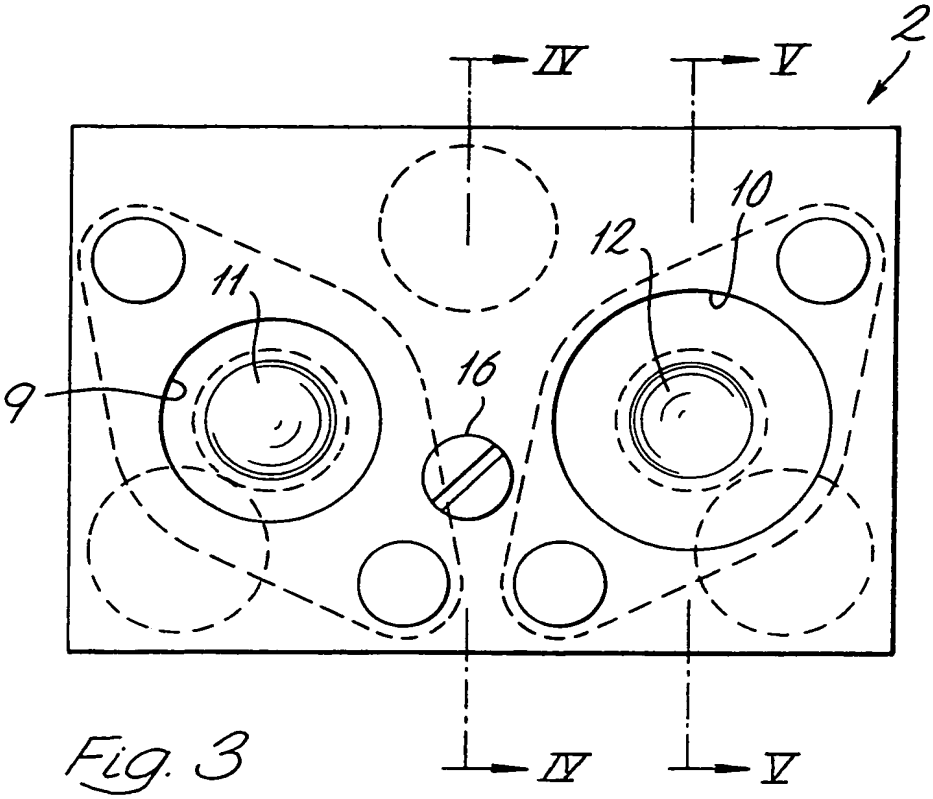

Fig. 3

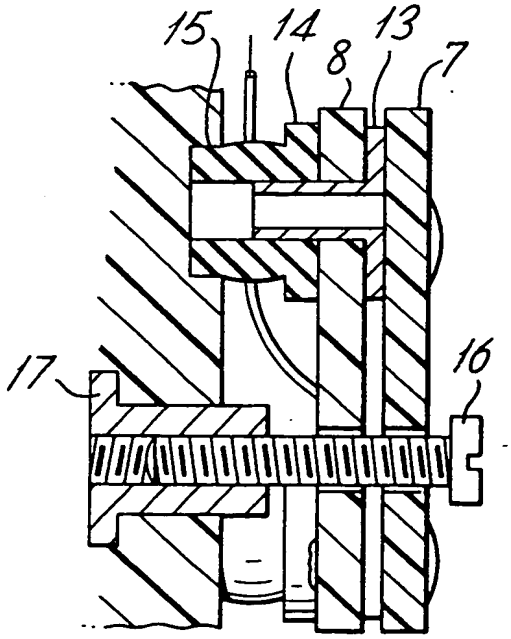

Fig. 4

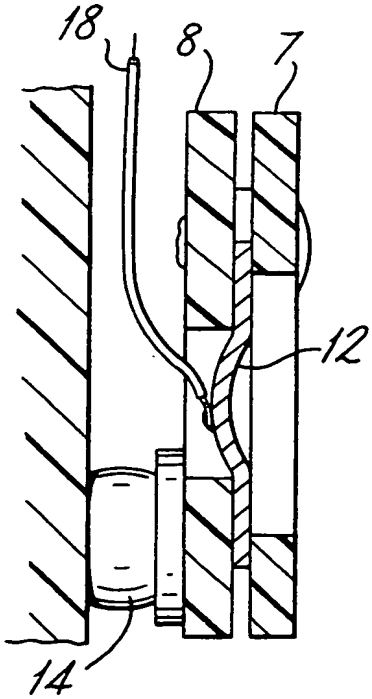

Fig. 5

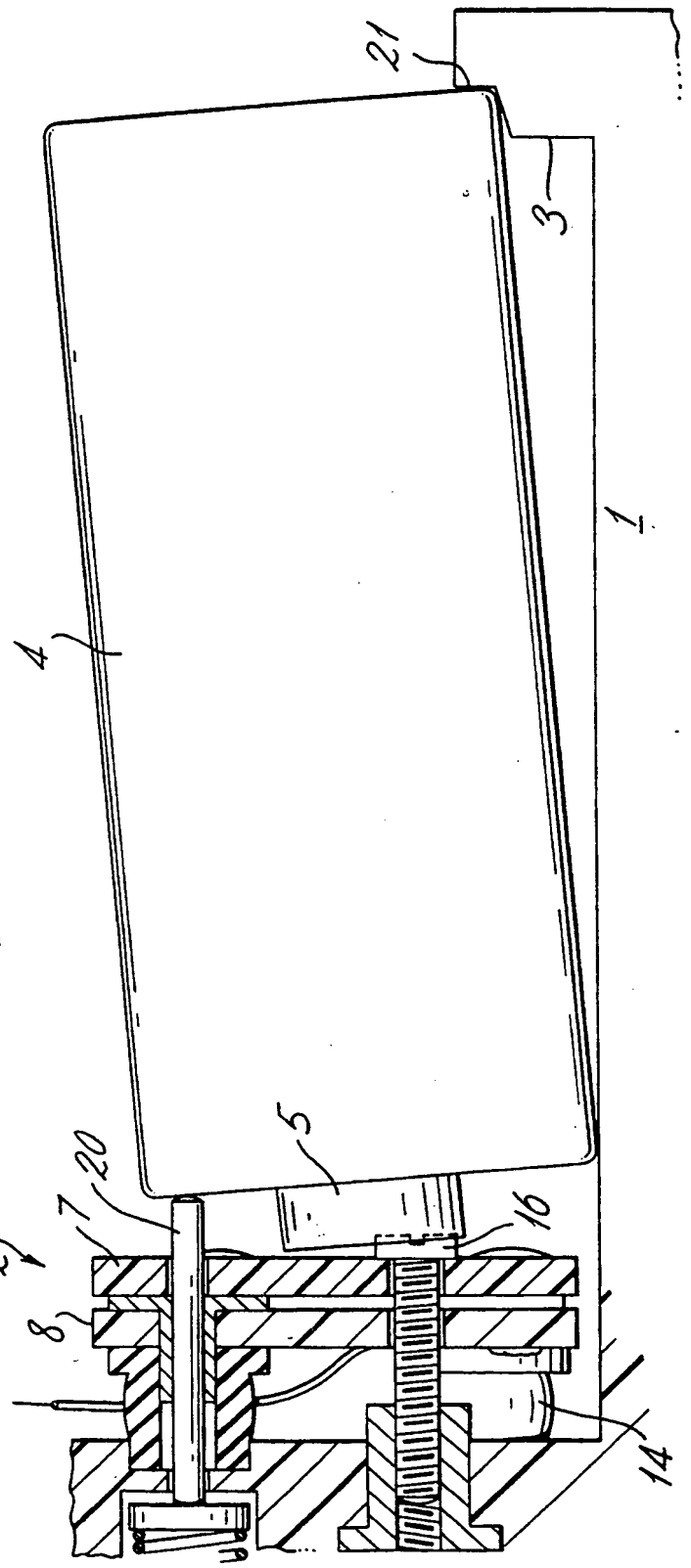

Fig. 6

SPECIFICATION
Battery Holders

This invention relates to battery holders.

Batteries are very widely used to power small electrical equipments and appliances and to assist in their replacement there is a considerable measure of standardisation in the sizes and in the terminals of batteries. A very common terminal arrangement is a pair of terminals protruding from an end face of the battery, as for example in the PP3 battery and other similar batteries. To assist in making connections of the correct polarity the terminals have different shapes and sizes. Contact is usually made through mating "snap-on" connectors or spring contacts. However, spring contacts give no protection against reverse polarity while "snap-on" connectors are often too tight or too loose. Furthermore while in some designs it is not possible to permanently secure a snap-on connector with reverse polarity it is quite possible to make momentary electrical contact through them with the connections the wrong way round. This can damage sensitive components if the circuit is switched on at the time.

It is an object of the invention to provide a battery holder in which electrical connection with reverse polarity cannot be made.

According to the invention a battery holder for a battery of the kind having a standard pair of terminals of different sizes protruding from an end face thereof comprises a terminal plate assembly resiliently mounted at one end of the holder and capable of limited movement in a direction generally normal to the plane thereof, the terminal plate assembly comprising an insulating front plate, a pair of holes through the front plate at positions and of sizes to accommodate battery terminals and electrical contact members positioned behind the holes so as to make contact with battery terminals only when they are passed through the holes.

Preferably a backstop is included for the face of the battery opposite to the terminal face and the backstop is spaced apart from the terminal plate assembly by a distance sufficient to enable a standard battery length to be accommodated only when the terminals thereof have passed through the holes in the front plate and the terminal plate assembly has been moved thereby through at least part of its limited movement.

In carrying out the invention the terminal plate assembly may be resiliently mounted by means of a plurality of individual resilient mounts.

Conveniently three such mounts may be provided. The resilient mounts may comprise rubber bushes which are compressed when the terminal plate assembly is moved by insertion of a battery into the holder.

In order that the invention may be more fully understood reference will now be made to the accompanying drawings in which:

Fig. 1 is a plan view of a battery holder with a battery inserted,

Fig. 2 is a side view of the battery holder of Fig. 1,

Fig. 3 is a front view of a terminal plate assembly,

Fig. 4 is a section along the line IV—IV in Fig. 3,

Fig. 5 is a section along the line V—V in Fig. 3.

Fig. 6 shows a battery holder with a battery in a "parked-off" position.

Referring now to Fig. 1 and Fig. 2 there is shown therein a battery holder which has a floor 1, a terminal plate assembly 2 at one end thereof and a backstop 3 at the opposite end thereof. The battery holder is dimensioned to accommodate a standard battery 4, for example of the PP3 size. Battery 4 has two terminals 5 and 6 protruding from an end face thereof, and terminal plate assembly 2 is designed to mate with and make electrical contact to terminals 5 and 6 when the battery 4 is correctly inserted in the holder.

The terminal plate assembly 2 is shown more clearly in the front view of Fig. 3 and the sectional views of Fig. 4 and Fig. 5. The assembly comprises an insulating front plate 7 and an insulating back plate 8 which are rivetted together. Front plate 7 contains two holes 9 and 10 of different sizes which are shaped and positioned to allow the differently sized positive and negative terminals 5 and 6 of a standard battery to pass through them. Sandwiched between the two insulating plates 7 and 8 are conducting contact plates 11 and 12 with which battery terminals 5 and 6 make contact when they pass through holes 9 and 10. Plates 11 and 12 are of similar shape and have dished centres. Plate 11 is offered convex to the smaller hole 9 and plate 12 is offered concave to the larger hole 10. Electrical leads 18 are secured to the respective contact plates 11 and 12.

Terminal plate assembly 2 is resiliently mounted relative to the remainder of the battery holder and is capable of limited movement in a direction normal to the plane of the assembly. The resilient mounting arrangement comprises a metal stud 13 having a flange sandwiched between plates 7 and 8 and a bush 14 of rubber or similar resilient material surrounds the shank of stud 13 and is retained in a well 15 in the body of the battery holder. As shown in various figures of the drawings, three such resilient mounts are provided for the terminal plate assembly. The terminal plate assembly 2 is held in position in the battery holder by means of a screw 16 which passes through an oversized hole in the terminal plate assembly and is secured in a threaded bush 17 in the body of the battery holder.

The distance between contact plates 11 and 12 and the backstop 3 is slightly less than the distance between the terminals of the battery for which the battery holder is designed and its opposite or back face. Also the thickness of front plate 7 is less than the amount by which the terminals protrude from the front face of the battery. Thus to insert a battery in the battery holder it must be entered with its terminals the

correct way around so that they pass through the respective holes 9 and 10 in insulating plate 7 and make contact with contact plates 11 and 12 and then a small additional movement is required to enable the back face of the battery to lie against backstop 3.

This small additional movement is taken up by the compression of the bushes 14 and is less than the allowed movement of travel of terminal plate assembly 2. The compressed bushes 14 in the resilient mounts act to provide a spring loading of the terminal plate assembly against the battery which both holds the battery in position in the holder and ensures good electrical contact.

Should an attempt be made to insert battery 4 into the battery holder with the terminals the wrong way round then the larger battery terminal cannot enter the smaller hole 9 and as a result there will be pressure at one side of terminal plate assembly 2 causing the assembly to be pushed back by its maximum amount.

The limited allowable degree of movement of terminal plate assembly 2 is such that even when the bushes 14 have reached their maximum compression there will still not be enough distance between the backstop 3 and the face of the assembly 2 to accommodate the battery and its terminals. Thus the back face of the battery cannot be inserted into the battery holder against backstop 3. Furthermore since the larger terminal of the battery does not enter hole 9 at all it is not possible to make electrical contact with both terminals of the battery even with partial or incomplete insertion of the battery into the holder.

Fig. 6 illustrates an arrangement which is similar to the arrangement described above but which has an additional feature enabling the battery holder to hold the battery in a parked or "off" position thus enabling the battery to be used as an on-off switch. This additional feature is a spring-loaded plunger 20 which passes through terminal plate assembly 2 and the backstop 3 is shaped to have an additional step 21 so that on slightly lifting the battery from backstop 3 the action of plunger 20 pushes the battery against step 21. The battery is thus still held in the holder but the battery terminals have been moved sufficiently so as not to make contact with the contact plates 11 and 12.

It will be understood that the battery holder described above can be modified without departing from the invention. Thus for example in place of the three resilient mounts shown a resilient layer of foam rubber or the like can be used.

Claims

1. A battery holder for a battery of the kind having a standard pair of terminals of different sizes protruding from an end face thereof comprising a terminal plate assembly resiliently mounted at one end of the holder and capable of limited movement in a direction generally normal to the plane thereof, the terminal plate assembly comprising an insulating front plate, a pair of holes through the front plate at positions and of different sizes to accommodate correspondingly differently sized battery terminals and electrical contact members positioned behind the holes so as to make contact with battery terminals only when they are passed through the holes, and a backstop for the face of the battery opposite to the terminal face.

2. The battery holder as claimed in Claim 1 in which the backstop is spaced apart from the terminal plate assembly by a distance sufficient to enable a standard battery length to be accommodated only when the terminals thereof have passed through the holes in the front plate and the terminal plate assembly has been moved thereby through at least part of its limited movement.

3. The battery holder as claimed in Claim 2 in which the amount of limited movement is insufficient to enable the battery to be accommodated between the backstop and the front plate of the terminal plate assembly with the battery terminals not inserted in their correct holes.

4. The battery holder as claimed in any one of the preceding claims in which the terminal plate assembly is resiliently mounted by means of a plurality of individual resilient mounts.

5. The battery holder as claimed in Claim 4 in which the resilient mounts comprise rubber bushes which are compressed when the terminal plate assembly is moved by insertion of a battery into the holder.

6. The battery holder as claimed in Claim 4 or Claim 5 in which three resilient mounts are provided.

7. A battery holder substantially as described herein with reference to the accompanying drawings.

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